

PATENT SPECIFICATION



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PROVISIONAL SPECIFICATION

Improvements in Rotors for Pumps and Blowers

We, DAVID BROWN & SONS (HUDDERSFIELD), LIMITED, of Park Gear Works, Lockwood, Huddersfield, in the County of York, a Company registered under the
 5 Laws of Great Britain, and HENRY EDWARD MERRITT, also of the above address, a British Subject, do hereby declare the nature of this invention to be as follows:—

10 This invention relates to the tooth or lobe profile of rotors used for the rotary gear type of pumps or blowers for dealing with fluids and gases.

An object of the invention is to avoid
 15 trapping of the fluid or gas, by the avoidance of a pocket between the crest of the lobe or teeth on one rotor and the root on the co-operating member. A further object of the invention is to provide rotors
 20 having smooth rounded contours in order to avoid frictional and turbulence losses.

According to the invention, the profile of the teeth or lobes on a section perpendicular to the axes, whether the said
 25 rotors be in the form of spur or helical gears, is such that over a considerable proportion of its length it is involute in form, the involute being joined by a circular curve or by a curve generated by
 30 or derived from a circular arc.

The tooth profiles formed according to the invention may best be described with reference to the generating or basic rack profile. For reasons of accuracy of manu-
 35 facture, the major portion of the generating rack profile is at present composed of straight lines whereby involute curves on a corresponding portion of the rotor teeth or lobes are generated. A feature of our
 40 invention consists in so modifying the basic rack that the crest and root of the

said rack are formed of circular arcs or curves of somewhat similar form, as for example, portions of an ellipse which join the straight sided portion of the rack cut-
 45 ter at two points, such that normals from the points of junction or tangency pass through the pitch point. In this way the transition of contact from the involute
 50 portion to the root or crest curve is smooth and continuous and in the case of a straight tooth rotor no trapping of fluid or gas is possible. If the same principle be applied to helically toothed rotors, a
 55 complete seal is maintained across the facewidth, on the assumption, implicit in both cases, that the involute profiles work with negligible backlash.

In particular, the basic or generating rack profiles may be so proportioned that the circular arc which forms the crest and root curves may be struck from the pitch point, that is to say the curve will have a radius equal to the addendum or dedendum of the teeth. In this case, the profile
 60 of the rotor teeth or lobes will also have crest or root curves of identical radius thus simplifying manufacture and measurement. It is not essential to the invention, however, that the centre of curvature should coincide precisely with the pitch point, and apart from the fact
 65 that if this is not the case, the tooth curve at the crest and root will not precisely coincide with a circular arc, the efficiency of the rotors as a pumping agent will not be seriously affected.

Dated the 27th day of September, 1934.

BARRON & LEWIN,
 Station Street Buildings, Huddersfield,
 Agents for the Applicants.

COMPLETE SPECIFICATION

Improvements in Rotors for Pumps and Blowers

We, DAVID BROWN & SONS (HUDDERSFIELD), LIMITED, of Park Gear Works,
 80 Lockwood, Huddersfield, in the County of York, a Company registered under the Laws of Great Britain, and HENRY EDWARD MERRITT, also of the above address, a British Subject, do hereby
 85 declare the nature of this invention and

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in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the tooth or
 90 lobe profile rotors used for the rotary gear type of pumps or blowers for dealing with fluids and gases.

An object of the invention is to avoid trapping of the fluid or gas, by the avoidance of a pocket between the crest of the lobe or teeth on one rotor and the root on the co-operating member. A further object of the invention is to provide rotors having smooth rounded contours in order to avoid frictional and turbulence losses.

According to the invention, the profile of the teeth or lobes on a section perpendicular to the axes, whether the said rotors be in the form of spur or helical gears, is such as shown in the accompanying drawing illustrating two co-operating pump rotors, that over a considerable proportion of its length it is involute in form, the involute portions *a* being joined by circular curves *b* or by curves generated by or derived from a circular arc.

The tooth profiles formed according to the invention may best be described with reference to the generating or basic rack profile. For reasons of accuracy of manufacture, the major portion of the generating rack profile is at present composed of straight lines whereby involute curves on a corresponding portion of the rotor teeth or lobes are generated. A feature of our invention consists in so modifying the basic rack that the crest and root of the said rack are formed of circular arcs or curves of somewhat similar form, as for example, portions of an ellipse which join the straight sided portion of the rack cutter at two points, such that normals from the points of junction or tangency pass through the pitch point. In this way the transition of contact from the involute portion to the root or crest curve is smooth and continuous and in the case of a straight tooth rotor no trapping of fluid or gas is possible. If the same principle be applied to helically toothed rotors, a complete seal is maintained across the face-

width, on the assumption, implicit in both cases, that the involute profiles work with negligible backlash.

The basic or generating rack profiles may be so proportioned that the circular arc which forms the crest and root curves may be struck from the pitch point, that is to say the curve may have a radius equal to the addendum or dedendum of the teeth. In this case, the profile of the rotor teeth or lobes will also have crest or root curves of identical radius thus simplifying manufacture and measurement. It is not essential to the invention, however, that the centre of curvature should coincide precisely with the pitch point, and apart from the fact that if this is not the case, the tooth curve at the crest and root will not precisely coincide with a circular arc, the efficiency of the rotors as a pumping agent will not be seriously affected.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

(1) A rotor for a rotary gear type pump or blower characterised in that the profile of the teeth or lobes on a section perpendicular to the axes, is such that over a considerable portion of its length it is involute in form, the involutes being joined by circular curves or by curves generated by or derived from a circular arc.

(2) A rotor for a rotary gear type pump or blower having its teeth or lobes shaped in profile, substantially as shown in the accompanying drawing.

Dated the 28th day of September, 1935.

BARRON & LEWIN,
Station Street Buildings, Huddersfield,
Agents for the Applicants.

[This Drawing is a reproduction of the Original on a reduced scale.]

